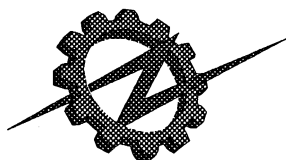
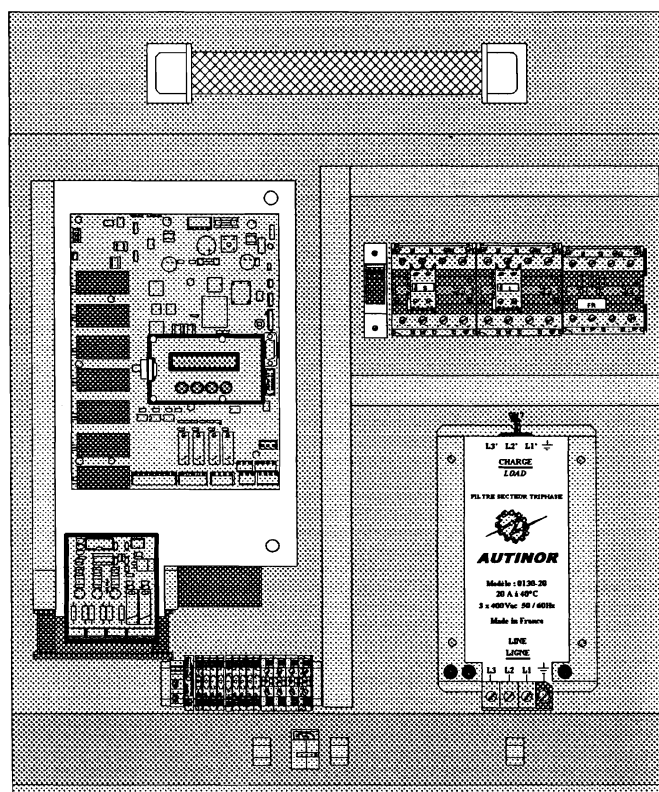


(7588)



AUTINOR

Installation Manual



Frequency Drive



VECTOR DRIVE

WARNING

This manual is deemed correct on going to press. It is linked to the program version shown on the front page, however this version may evolve without influencing the contents of this manual, which may in itself be changed without prior warning.

The information contained has been scrupulously checked. However AUTINOR declines all responsibility for error or omission.

Should you notice any discrepancy or unclear description, or if you have any suggestions, we would appreciate your written comments (by mail or fax) to :

Société **AUTINOR**
Z.A. Les Marlières
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We can only authorise a complete copy, without addition nor removal of information

Where quotations are taken, the following at least must be noted :

- the company name of AUTINOR,
- the program version to which it refers,
- the number and date of the original edition.

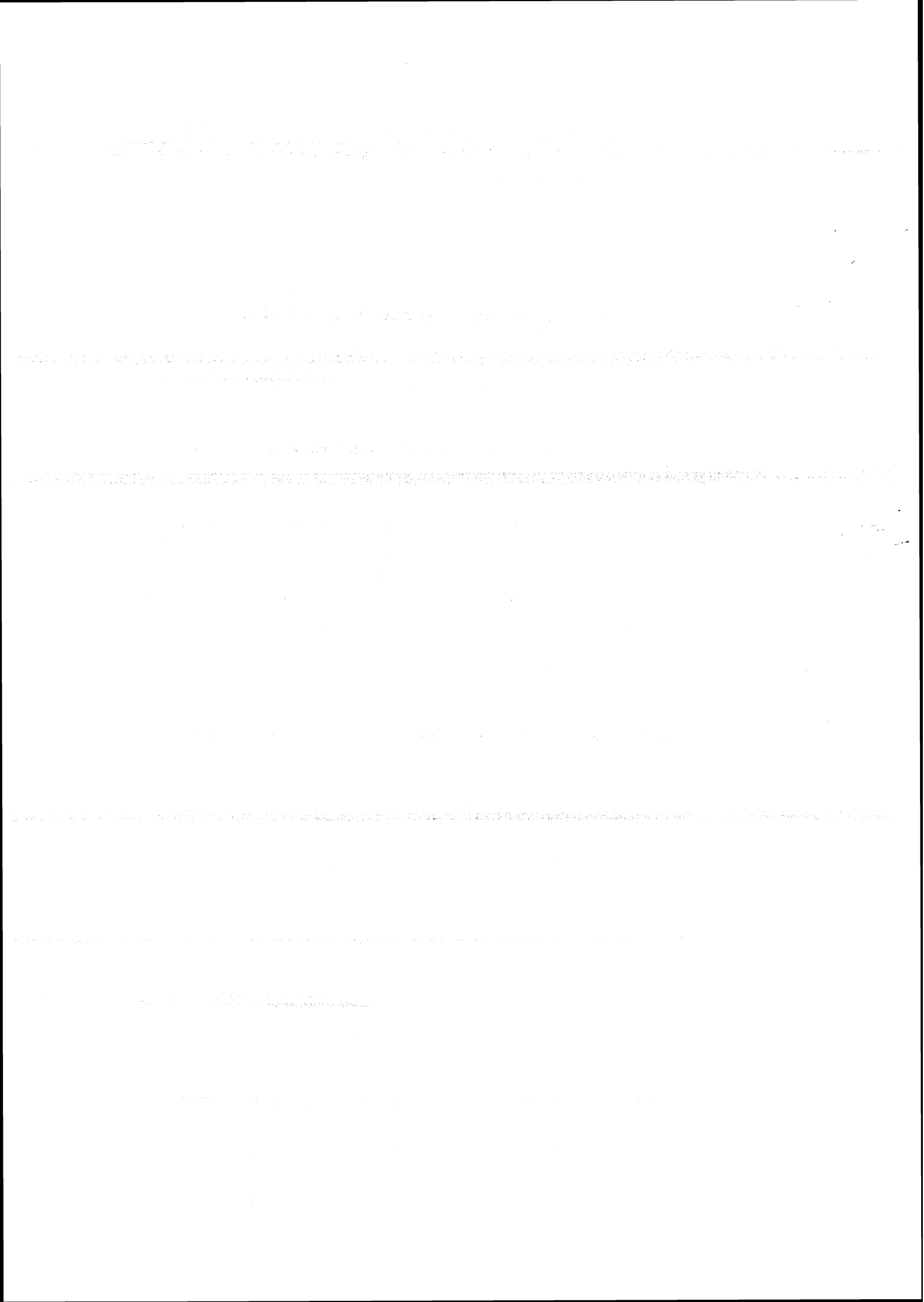
ELECTROMAGNETIC COMPATIBILITY

Since the 1st January 1996 all lift installations are obliged to respect the essential requirements of the European Directive 89/336/CEE concerning Electromagnetic Compatibility (EMC).

The VECTOR DRIVE is only one component of an installation ; it is therefore not obliged to show the **CE** marking as stated in this directive. However in order to allow you to write your **declaration of conformity**, and according to professional rules, all **AUTINOR** controllers are supplied with an ***engagement of conformity***.

Your declaration of conformity can only rest on this engagement.

if the VECTOR DRIVE has been installed exactly as advised in this manual.



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PREAMBULE**Handling advice for equipment :**

Whatever the load, handling operations can be dangerous (collision, dropping, crushing,...). Whenever possible use mechanical handling rather than manual handling. When manual handling can not be avoided, respect the rules.

At european level, these rules are set out in the Directive 90/269/CEE, Consil Directive dated 19 May 1990 « concerning minimal health and safety instructions for manual load handling with risks, to the worker, notably in the lower spiral area ».

	Load permitted (occasional carrying)	Load permitted (constant carrying)
Man 18 / 45 years	30 kg	25 kg
Man 45 / 60 years	25 kg	20 kg

Safety measures:

Respect the instructions which were given to you by your hierarchy for the use of the individual protection equipments (gloves, shoes, glasses..., anti-falls device).

LIMITS OF USE.

The **VECTOR DRIVE** controls lift motor whose speed can reach **3 m/s**.

The Motor must be equipped with a **double beam incremental encoder**, **500 to 2500 point per turn**, output voltage **10V-30V**.

The Lift can work with a direct approach provided the controller gives a **very accurate** slow down signal.

The **VECTOR DRIVE** can generate **5 speeds**, **V2, V1, V0, V_{INS} and V_{ISO}**.

RANGE OF VECTOR DRIVE PRODUCTS:

	Maximal Values
Model 2 :.....	20 A in 415V - 11 HP - 8 kW
Model 3 :.....	30 A in 415V - 16,5 HP - 12 kW
Model 4 :.....	40 A in 415V - 20 HP - 15 kW
Model 5 :.....	50 A in 415V - 27,5 HP - 20 kW
Model 6 :.....	70 A in 415V - 39 HP - 28,5 kW
Model 7 :.....	90 A in 415V - 50 HP - 37 kW
Model 8 :.....	110 A in 415V - 61 HP - 45 kW
Model 9 :.....	160 A in 415V - 89 HP - 65 kW

IMPORTANT :

The current values shown in the table take into account the fact that the motor is **not equipped with a inertia handweel**.

All the VECTOR DRIVE are equipped with a 3 phase network current filter, Motor filter, Regenerative resistors and contactors.

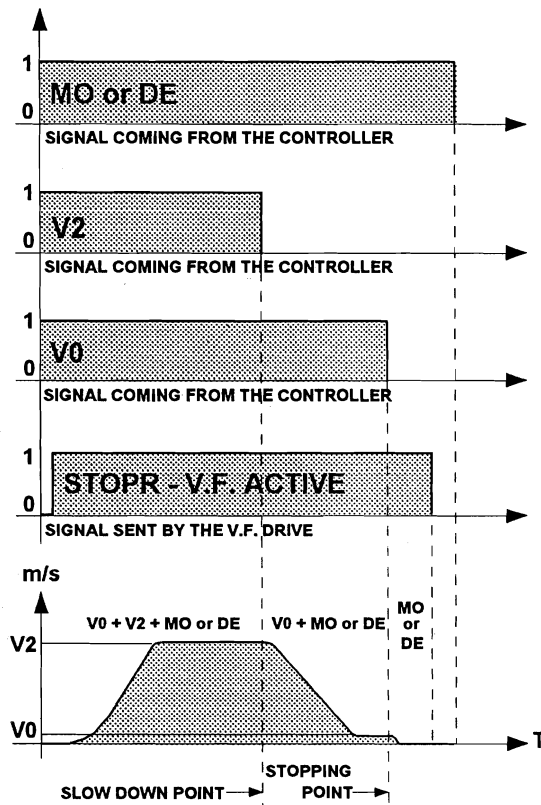
CONTROL OF THE FREQUENCY DRIVE.

For the Frequency Drive to work, it needs as well as a full safety lane, to receive from the lift controller :

- the direction Up or Down, and the movement speed (V2, V1, Vins, Viso or V0),

MOVEMENT IN V2 :

If the Lift controller decides to move off in full speed V2, it will simultaneously activate the Inputs V2, V0 and MO or DE.



The slow-down will take place by losing V2 but keeping V0 and MO or DE until the stopping point.

The slow-down signal (loss of V2) should come at the point corresponding to the deceleration distance (DV2) read in the graph below increased by 10 centimetres run in V0.

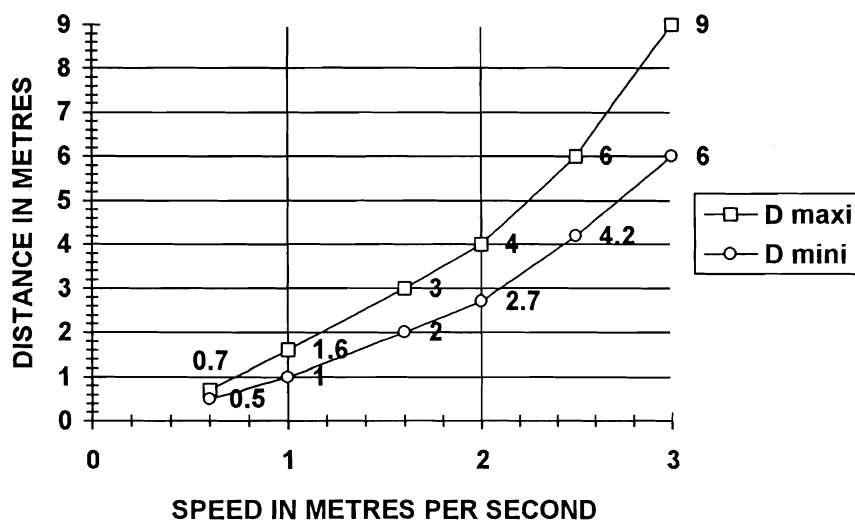
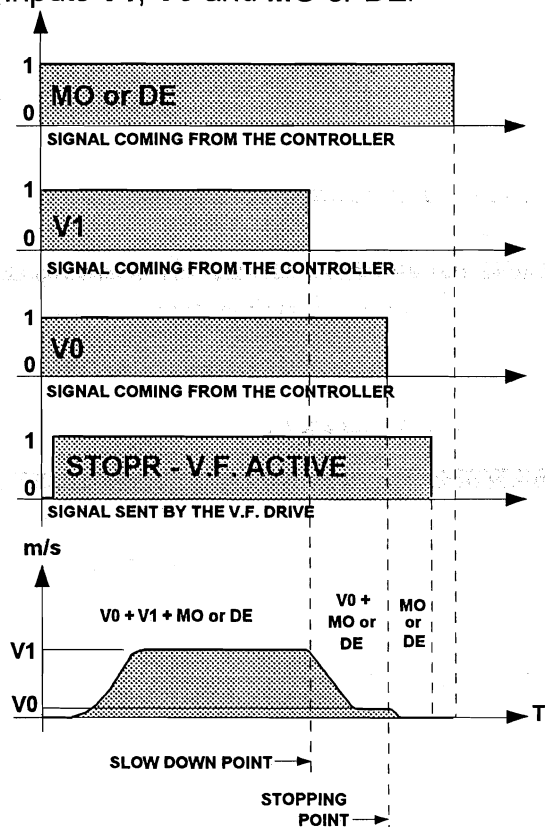


Figure 1
Slow down distance
DV2 in relation to the
nominal speed

MOVEMENT IN V1 :

* If the controller decides to move off in **V1** speed, it will simultaneously activate the Inputs **V1**, **V0** and **MO** or **DE**.



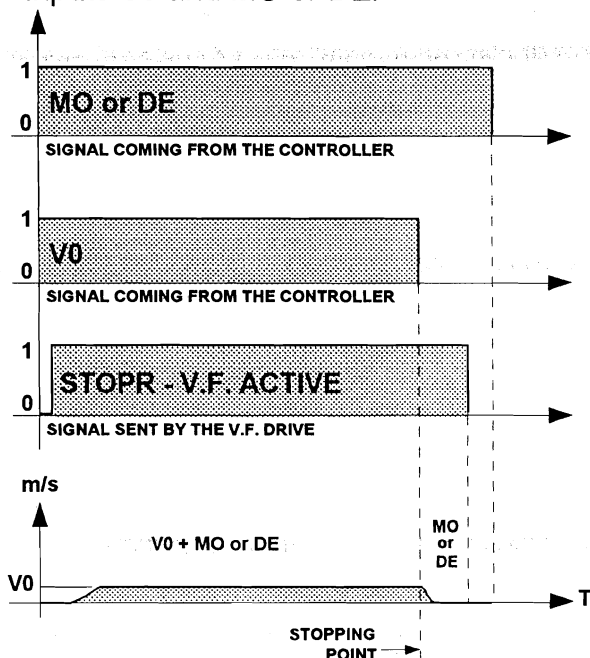
The slow-down will take place by losing **V1** but keeping **V0** and **MO** or **DE** until the stopping point.

Note:

When on Inspection, you will lose **V1** and **V0** to stop on the brake.

MOVEMENT IN V0 :

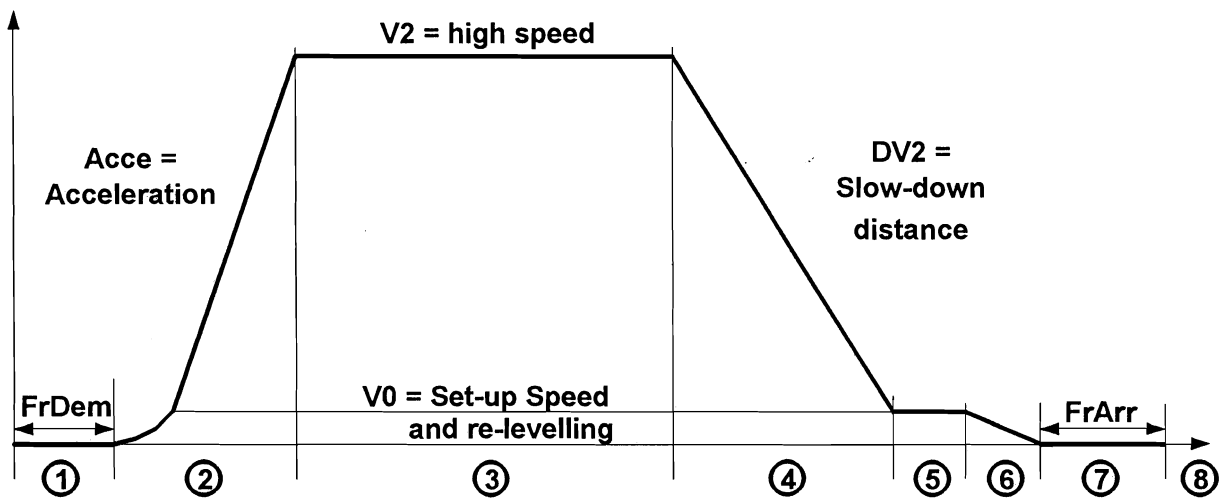
* If the Lift controller decides to move off in **V0**, it will simultaneously activate the inputs **V0** and **MO** or **DE**.



V0 will disappear at the stopping point.

The movement inputs **V0**, **V1**, **V2**, **UP** (**MO**) and **DOWN** (**DE**) use opto-electronic couplers which can receive AC or DC signals from 24 to 220 V.

DESCRIPTION OF THE SEQUENCE OF SIGNALS FROM START-UP IN FULL SPEED V2 UNTIL STOPPING.

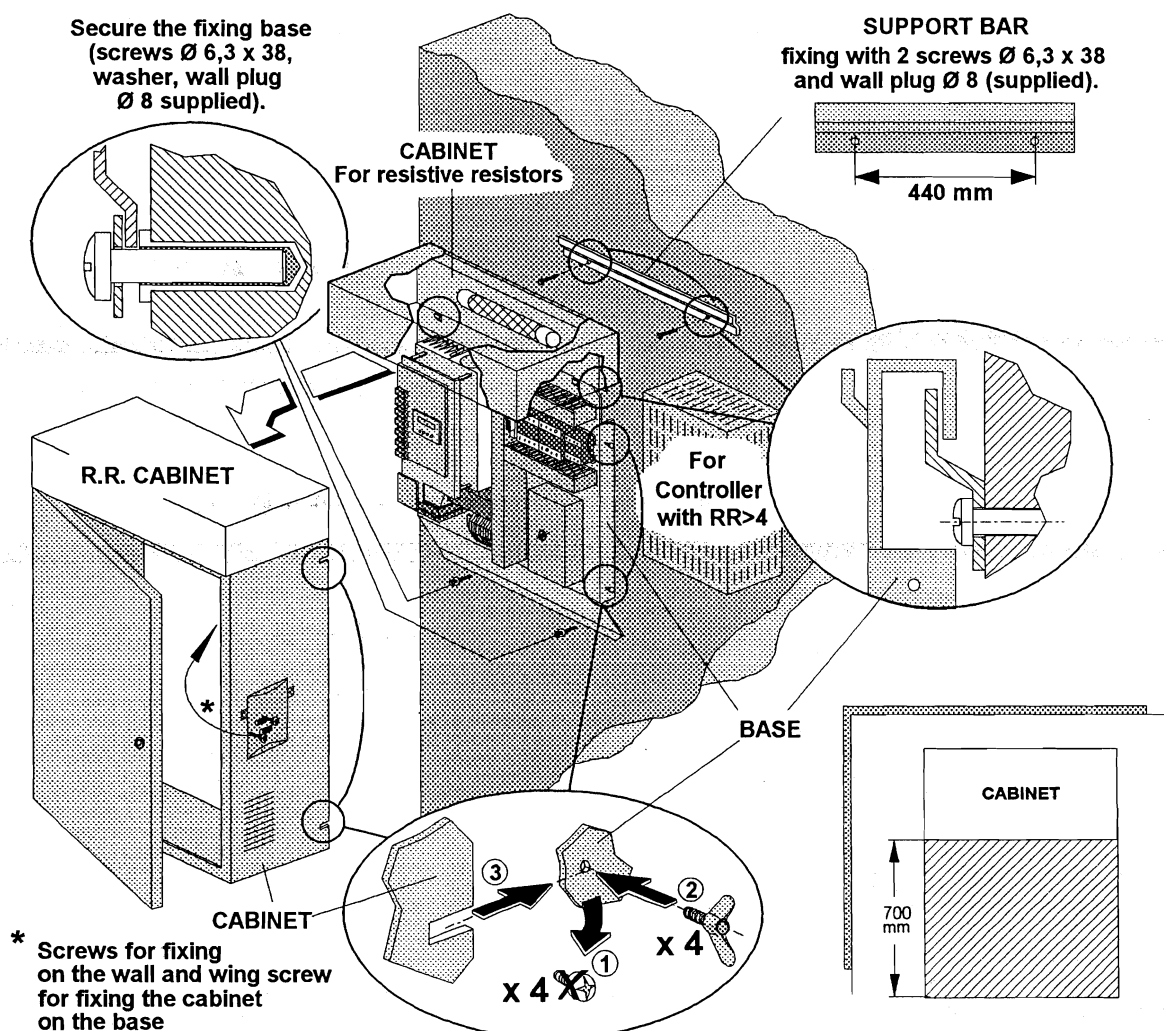


1. When the controller has decided that it can use full speed **V2**, it will activate **V2**, **V0** and give the direction **Up** (**Mo**) or **Down** (**De**). The VECTOR DRIVE having received the order to move, energises the **L** contactor. Then about 200ms later, The **S** safety contactor. **L** and **S** allow the brake to be energised whilst the rotor is electrically stabilised. This electric stabilisation will last the time programmed at parameter « **FrDem** » (*Brake time at start-up*).
2. We start by applying low voltage and the lift accelerates. The acceleration will last the time programmed at parameter « **Acce** » (*Acceleration*).
3. The lift has reached the speed corresponding to the value programmed at « **V2** » (*Full speed*).
4. The slow-down signal is given, the **V2** signal disappears but **V0** stays along with **MO** and **DE**. The car slows down according to the distance programmed at parameter « **DV2** » (*Slow-down distance in V2*) to reach **V0**.
5. **V0** is reached, the signal is given, the **V0** and **MO** or **DE** are kept until the stopping point.
6. The stopping point is reached, **V0** disappears but keeping the direction **MO** and **DE** and the transition from **V0** to zero speed start.
7. When zero speed is reach, the VECTOR DRIVE electrically stabilises the rotor for the time programmed at parameter « **FrArr** » (*Brake time on stopping*).
8. The VECTOR DRIVE drops the brake by deactivating the brake contactor **BR** (**FR**). An **L** or **S** contact (**STOPR**) informs the controller that the movement is finished so that the **MO** or **DE** direction signal can be deactivated and the doors opened.

NOTE :

Stages (5), (6), (7) and (8) have been voluntarily exaggerated in order to clearly the drawing.

INSTALLATION OF THE CONTROL PANEL.



Cabinets dimensions :

- Models 2, 3, 4, 5*, 6* : L = 562 mm, H = 680 mm, P = 285 mm, Weight = app 40 Kg
With further cabinets for resistors : L = 320 mm, H = 600 mm, P = 250 mm.
- Models 7, 8 and 9 : L = 800 mm, H = 1200 mm, P = 400 mm.

NB :

For the purpose of delivery, the support bar is fixed to the studs for fixing the cabinet.

Entry for wiring and trunking is at the bottom.

Don't forget than the EN-81 part 1 Standard § 6.3.2.1 (a), amended by British national variation BS 5655 § V.3.14 requires that :

6.3.2.1 The dimension of machine room shall be sufficient to permit easy and safe access for service personnel to all components, especially the electrical equipment.

In particular there shall be provided :

(a) a clear horizontal area in front of the panels and the cabinet. This area is defined as follows : (N.c) depth, measured from external surface of the enclosures, at least **0.9 m**. This distance may be reduce 0.6 m in front of protruding controls (handles, etc.). width, the full width of panel or cabinets by 2.14 m high.

CONTROLLER POSITION AND ELECTROMAGNETIC COMPATIBILITY (1/3)

When the machine room supports or is near a radio or television reception aerial, do not put the controller cabinet in the aerial receiving zone (figure 2).

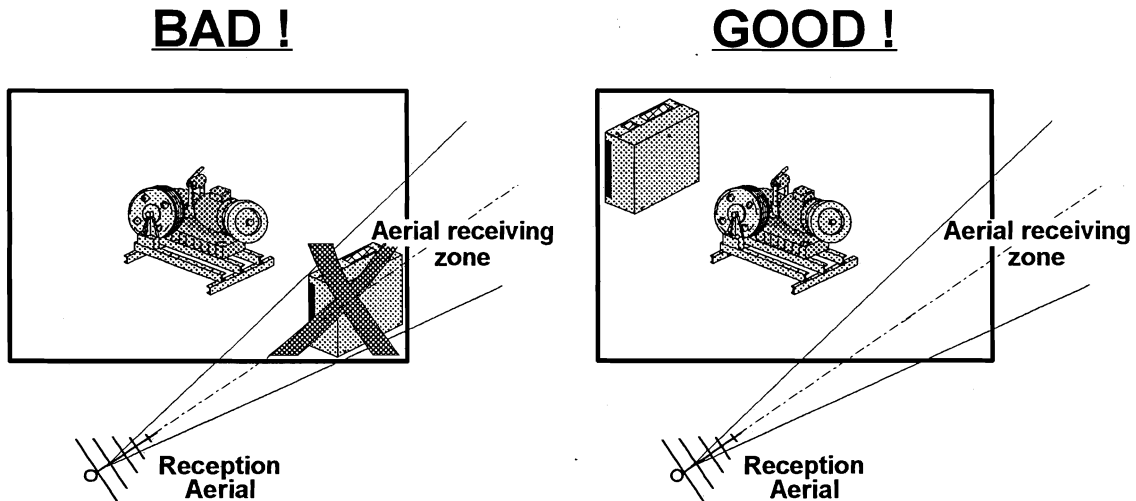
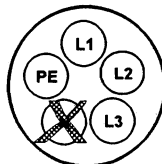


Figure 2 Placing the frequency drive outside the aerial receiving zone

If you can not find a suitable place for the frequency drive cabinet, get the aerial moved !. If that is not possible, contact **AUTINOR** who will decide along with the building owner, what measures need to be taken according to the EN 12015 and EN 12016 Standard for *lifts, escalators and passengers conveyors*.

PRECAUTIONS TO TAKE.

1. The power supply arrival **L1, L2, L3 and Earth (Yellow/Green)** must all pass through the same cable.



2. The power link between the **VECTOR DRIVE and the motor (11, 12, 13 + Earth)** must go through the same cable. In order to reduce disturbances a screened cable must be used, even if the motor cable is mechanically protected by a tube or metal trunkway. This screening should consist of at least one flat cable, the greater the number of flat cables the greater the efficiency of the screening. The cable should be supplied for ease of installation in the machine room and should comply with EN 81 standards. To be completely efficient the screening must be connected at the same time to the controller metal casing and to the motor metal housing. In order to reduce any coupling effects, it is advisable to maximise the distance between the motor cable and the three phase power supply cable, both inside and outside the controller ; for the same reason, you should keep the cables carrying high current as far apart from those carrying low current as possible. These two types of cable should not be placed in the same trunkway, nor go through the controller casing via the same hole.

ELECTROMAGNETIC COMPATIBILITY PRECAUTIONS (2/3)

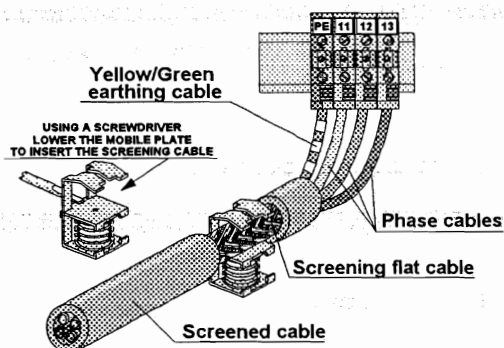
At not time should the screening cable replace the yellow-green earthing cable.

ADVICE : In order to ensure the electromagnetic compatibility, it may be necessary to use to connect to the motor, a metal stuffing box with a screening contact allowing an efficient electrical link between the flat screening cable and the metal housing (see figure below).

If the motor terminal box is isolated, then a metal stuff box is of course useless. The screening cable should be linked in the shortest way to the motor earth terminal block.

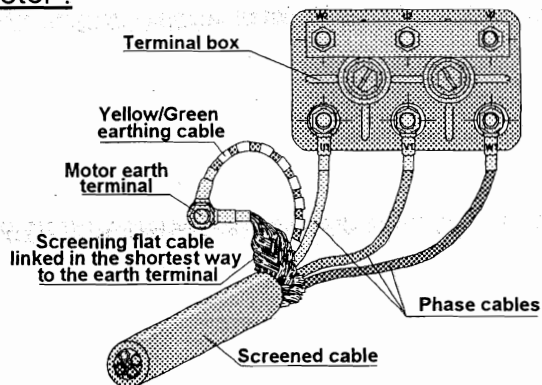
• Conventional connection :

Controller :



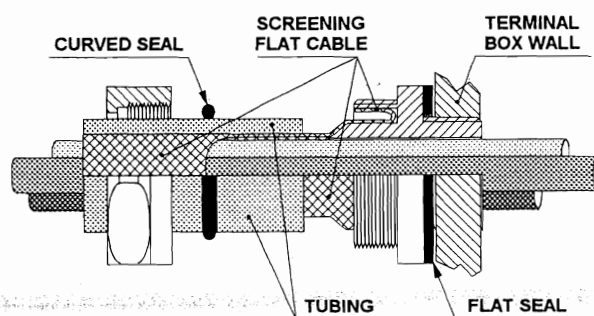
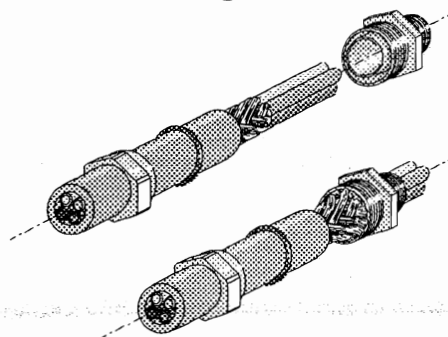
Note : Keep the motor cable as far apart from the power cable as possible, inside as well as outside the controller.

Motor :



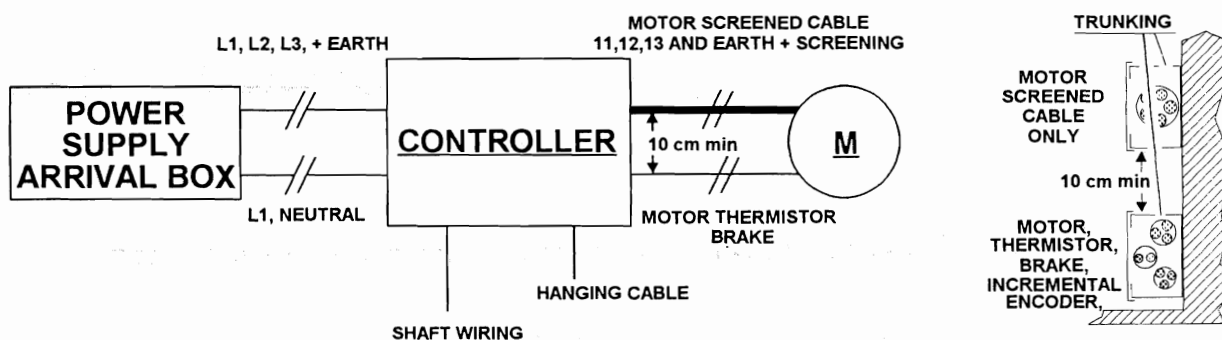
Note : The cables should only be separated from the screening once inside the terminal box.

• Connection using stuff-box :



3. The other links between the **VECTOR DRIVE** and the **motor**, i.e. the brake (+BR and -BR), the motor thermistor (0V, STH) can run together but kept at least **10 cm** from the power cables.

EXAMPLE :



Check that the power supply arrival does not flow close to the **VECTOR DRIVE** and motor link.

USE OF DIFFERENTIAL CIRCUIT BREAKERS WITH AUTINOR FREQUENCY DRIVES (3/3)

First of all as a reminder :

- The low voltage directive explicitly states that electrical lift installations are excluded relating from its field of application and so the standards relating to electrical installations only applies as for as the input terminals of the main lift installation switch (cf EN 81 § 13.1.1.2) ;
- nevertheless the safety of all people must be ensured, and so to do this, we rely as much as possible on the detail of C 15-100 taking into account the imperatives concerning lifts.

The standard C 15-100 § 532.2.1.3 states that :

« Les dispositifs de protection à courant différentiel-résiduel doivent être choisis et les circuits électriques divisés de telle manière que tout courant de fuite à la terre susceptible de circuler durant le fonctionnement normal des appareils ne puisse provoquer la coupure intempestive du dispositif. »

AUTINOR frequency drives have a normal current leakage of 60 mA when the car is stopped or empty and around 300 mA when loaded. We therefor recommend the motor be supplied through a differential circuit breaker with a differential current (= « sensitivity ») $I_{\Delta n} = 500$ mA.

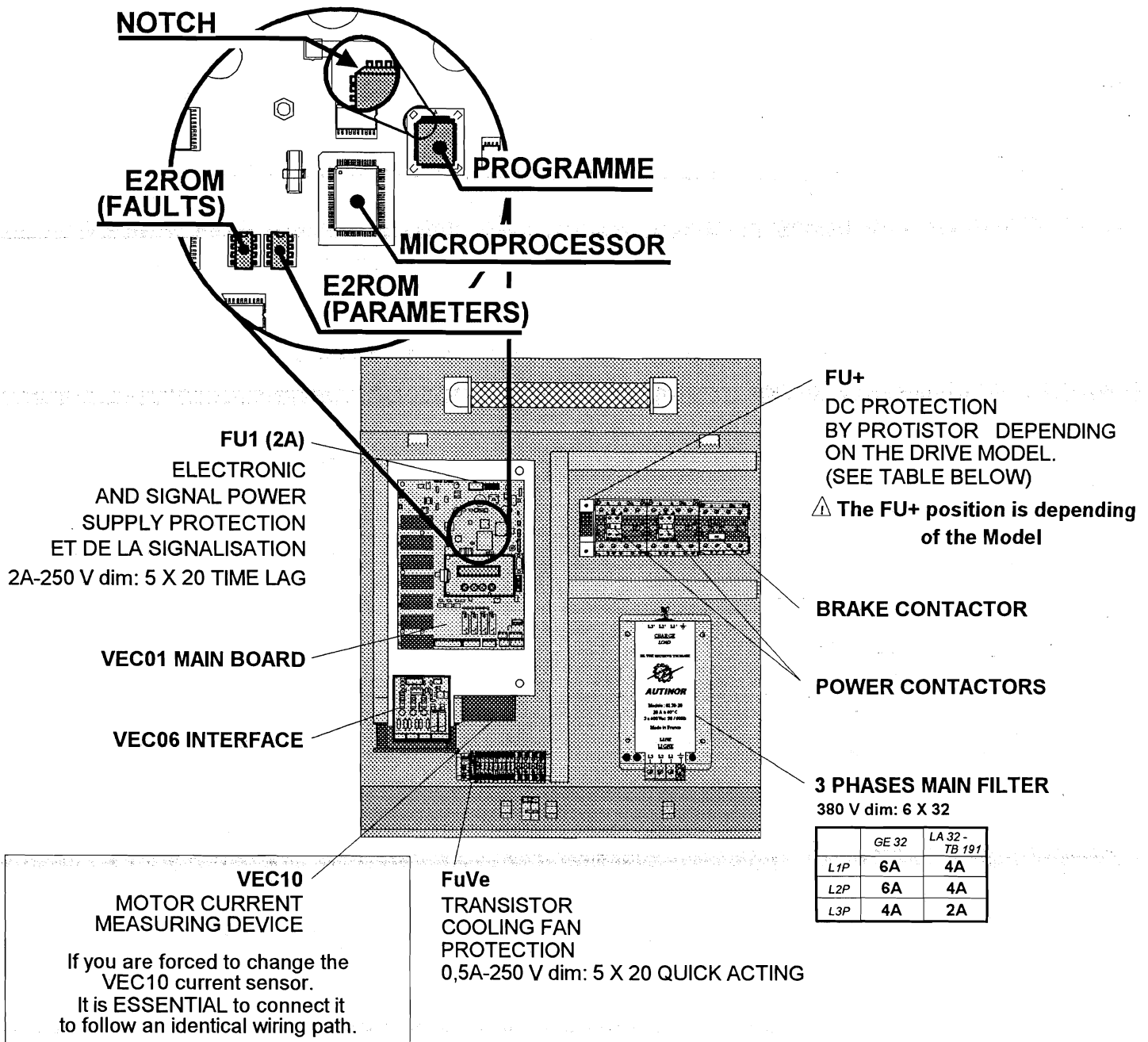
What is more, C 15-100 states that for electrical installations cabled conform to the TT diagrams (installations powered by the public electricity network), people should be protected against indirect contacts by differential residual current circuit breaker which implies the following of the relation ship which links the circuit breaker differential current $I_{\Delta n}$ to the maximum conventional voltage of the U_L contact and of the earthing socket resistance :

$$I_{\Delta n} * R_A \leq U_L \text{ (NF C 15-100 § 532.2.4.2)}$$

Protection may be ensured by using a differential circuit breaker with a sensibility of 500 mA, provided the building's earthing socket resistance is maximum 100 Ω for a lift installation, whose maximum conventional voltage of the U_L contact is 50 V. It is up to the owner to supply the electrician with the resistance value of this earthing socket, so that the electrician may ensure that the differential sensitivity ensures the correct protection against indirect contact.

If the earthing socket resistance exceeds 100 Ω , the electrician may use an S type differential circuit breaker with a differential current of 300 mA, which will ensure protection against indirect contact for an earthing socket resistance of up to 167 Ω . You should nevertheless ensure that a « full load » movement does not break the circuit at the wrong moment.

LOCATION OF COMPONENTS AND FUSES.



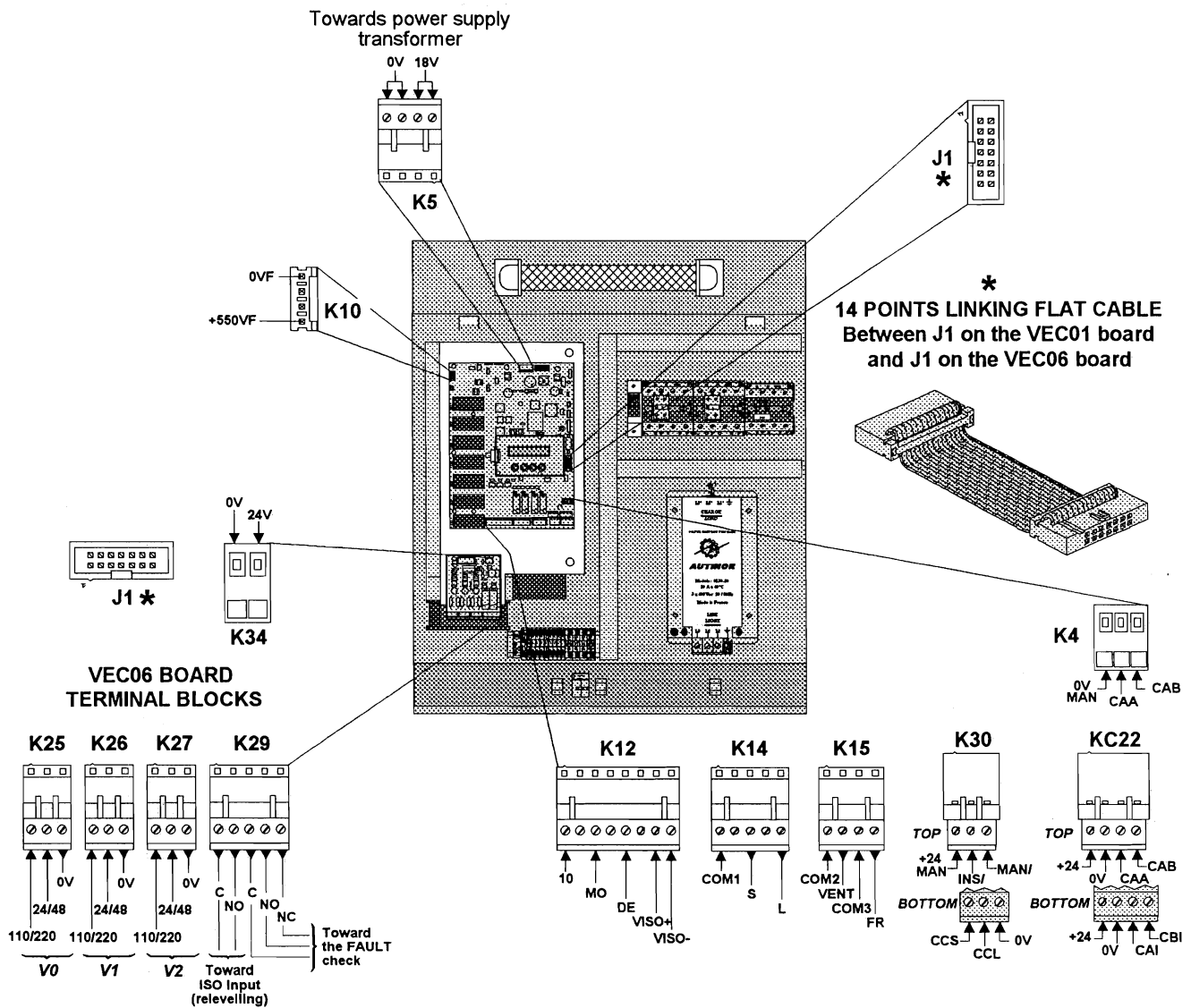
ATTENTION !!!

ONLY USE PROTISTORS®
CAPABLE OF WITHSTANDING 600V
AND SPECIALLY CONCEIVED
TO PROTECT SEMI-CONDUCTORS.
THE USE OF OTHER FUSES
IS **DANGEROUS**

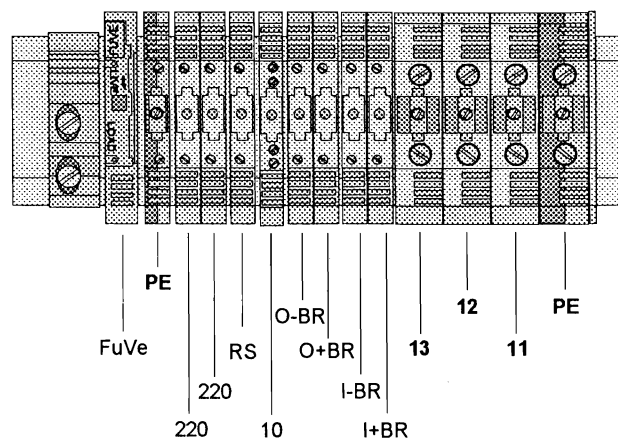
AND COULD DAMAGE
THE TRANSISTORS IF THERE IS A POWER
SURGE OR SHORT CIRCUIT !!!

MODEL	PROTISTOR®
N°2	25 A (10x38)
N°3	40 A (14x51)
N°4	50 A (14x51)
N°5	63 A (22x58)
N°6	80 A (22x58)

LOCATION AND WIRING OF TERMINAL BLOCKS (1/2).



Electromechanical Terminal Rail



POWER SUPPLY

WARNING : It is recommended to use a TORIC transformer !



Note : The incremental encoder must be connected even for the first movements in slow speed.

INCREMENTAL ENCODER	
STEGMAN	HENGSTLER
+24	RED
0V	BLUE
CAI	WHITE
CBI	PINK
GREEN	

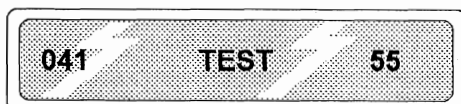
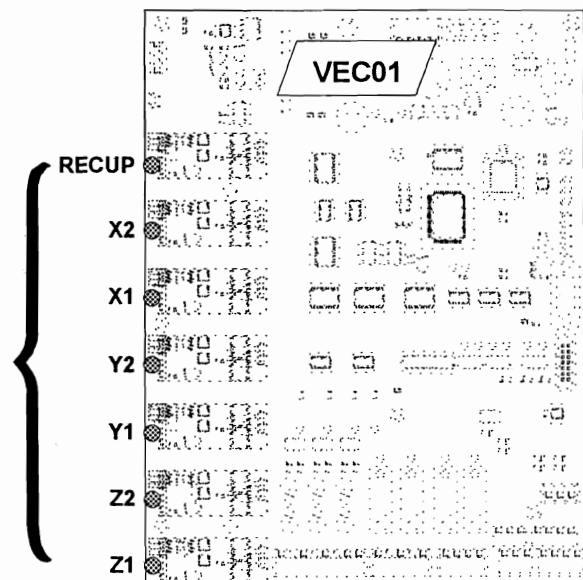
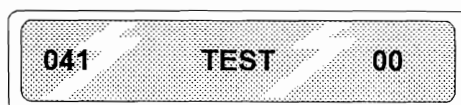
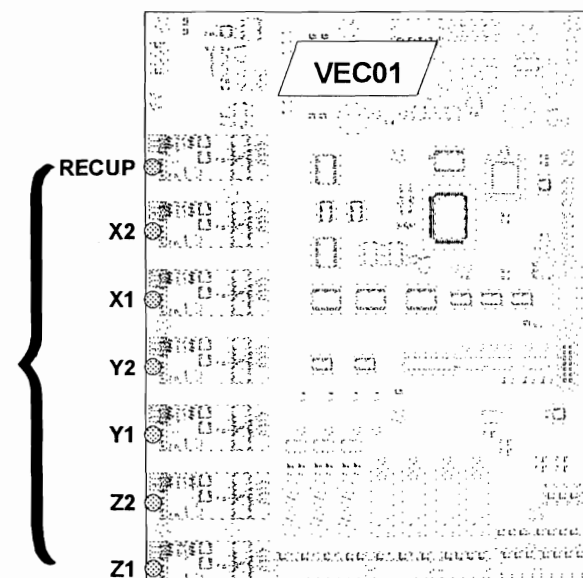
Cut the wires which are not used.
Screen cable do not connect.
Wires CAI and CBI should be crossed in.

POWER-UP FOR INITIAL MOVEMENT (1/2).**Switch on the power :**

- The LEDs showing the transistors are green.

CUT THE SAFETY LANE

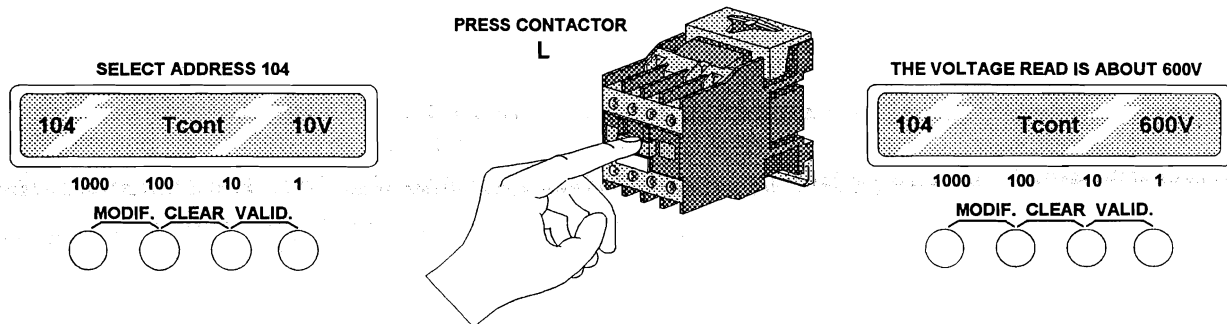
Please see page 21 for the description of how to use the frequency drive parameter/diagnostic communication device

Checking the transistor control :**1) At address 041, write 55****THE LEDS BECOME RED.****2) At address 041, write 00****THE LEDS BECOME GREEN AGAIN.**

POWER-UP FOR INITIAL MOVEMENT (2/2).

To check the capacitor voltage :

CUT THE SAFETY LANE !



To check the VEC10 current measuring device :

- Check at addresses **12A** and **12C** that the value is between 500 and 524. If the value are not coherent, check the connection of the **K8** connector of the **VEC01** board.

To check the incremental encoder connection :

- Check at address **116** on the parameter/diagnostic communication device (see page 23) that the number of impulses **increases** as you turn the rotor in the **direction** corresponding to **up**, and **decreases** in the **direction** corresponding to **down**. Turn the rotor **gently** by hand.

If the number of impulses changes in the wrong direction, inverse the **CAI** and **CBI** wires on the **KC22(bottom)** connector of the **VEC01** board.

Check that the parameters are coherent.(see page 37) :

RECONNECT THE SAFETY LANE !

Try an up movement and then a down movement, and check that the lift starts off in the required direction.

Possible faults :

The system might come up with one or more of the following fault codes :

- **17** : Phase **failure** or **inversion** of the controller.
- **102** : **Gap** between the **advised** and **real speed** of more than **15%** in **Slow Speed**.
- **100** : Motor **over-intensity**.
 - ♦ **Cross** two of the motor phases.
 - ♦ Check that the encoder is **wired correctly**.
- **62** : **O03** tape head **fault**.

FREQUENCY DRIVE PARAMETER/DIAGNOSTIC COMMUNICATION DEVICE

This chapter contains information which will allow you to adapt the equipment to the specific conditions of the lift on which it is installed.

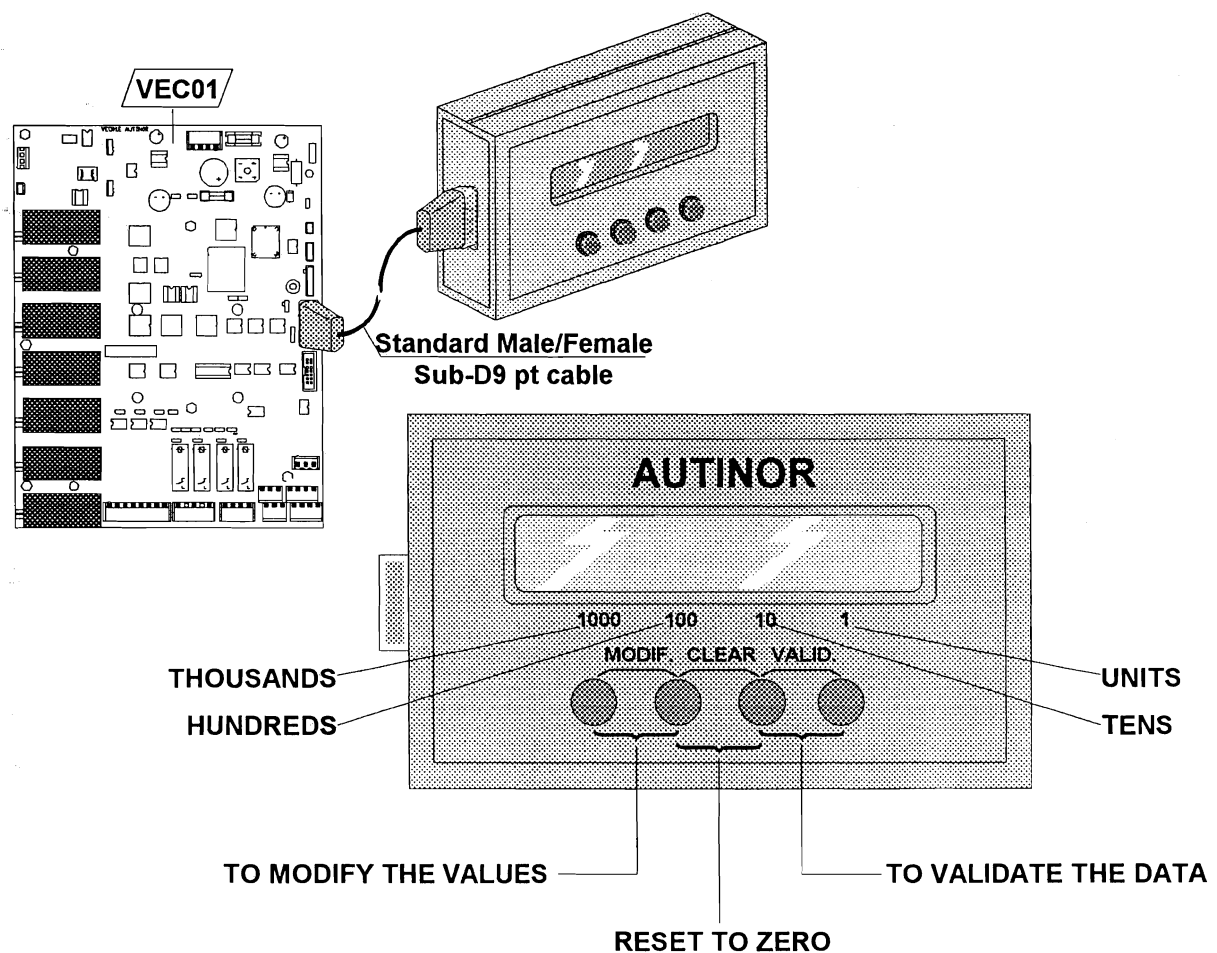
This adaptation is controlled by **parameters**, which you can modify according to your needs using the removable parameter / diagnostic communication device as described below in the paragraph *Accessing the parameters*.

The parameters are memorised in a particular type of chip called an **EEPROM**¹ (or E2PROM) which **keeps the information even when the equipment is switched off**.

Each parameter is linked to an **abridged name** and an **address** which corresponds to the position at which it is memorised in the EEPROM chip.

ACCESSING THE PARAMETERS

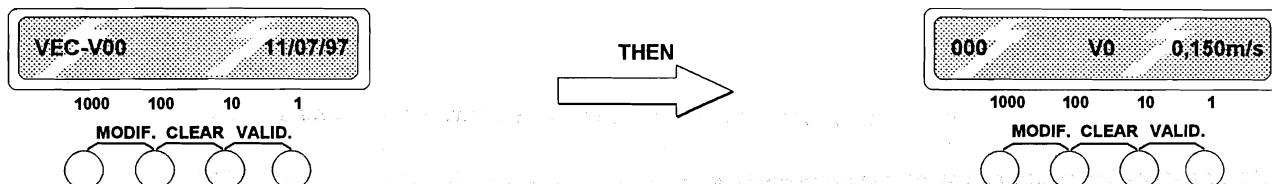
As mentioned above, you can see and modify the parameters using the parameter/diagnostic communication tool ; this consists of a 16 character LCD display with four push buttons, which is connected to the **VEC01** board by a standard Male/Female Sub-D9 pt cable.



1 EEPROM stands for *Electrically Erasable Programmable Read Only Memory*.

To access the parameters and the input-output information

Power-up the equipment, the display shows :



Each time you press **1** the value shown will increase by **1**.

Each time you press **10** the value shown will increase by **10**.

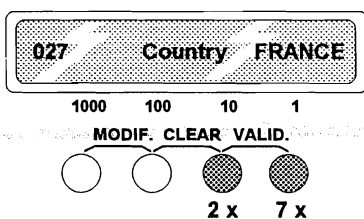
Each time you press **100** the value shown will increase by **100**.

Choosing the language

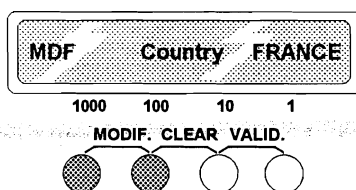
The parameter/diagnostic communication device is preset to the language of the destination country. There are four options which appear at address **027** as follows :

FRANCE, ENGLISH, DEUTSCH, ESPAGNOL.

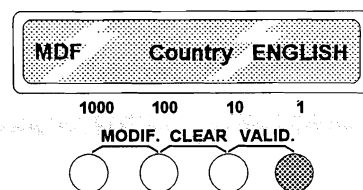
Press twice button **10**,
then 7 times button **1**,
for address **027**



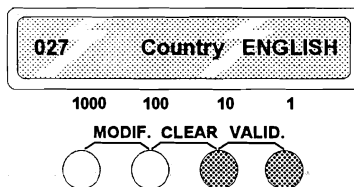
Press both **MODIF** buttons
at the same time



Press button **1** and choose the
required language.



Register the required language by pressing both **VALID** buttons at the same time

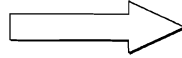
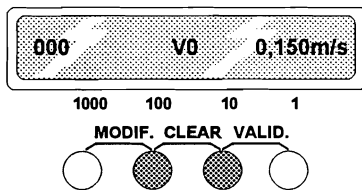


The language in our example is **English**

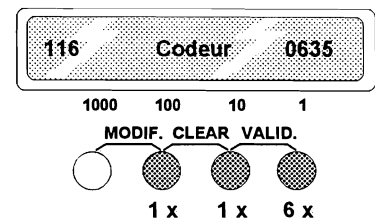
Other example :

Viewing the incremental encoder impulses (see page 20).

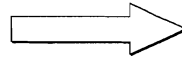
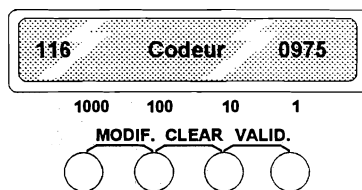
Reset the display to address **000**
by pressing the **CLEAR** buttons
simultaneously



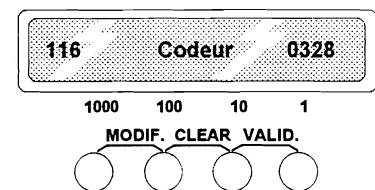
Display address **116** using
buttons **100**, **10** and **1**



The value displayed at address
116
increases when the rotor turns
in the **upwards** direction

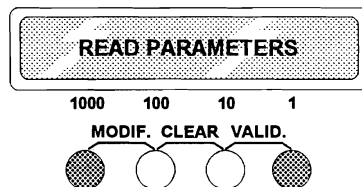


The value displayed at address
116
decreases when the rotor turns
in the **downwards** direction

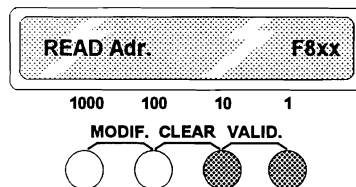


Transfer of the settings included in the VVVF toward the diagnostic tool.

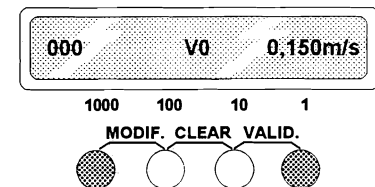
Press the 2 end buttons to make
« **READ PARAMETERS** »
appear.



Validate by pressing the
« **VALID** » buttons
..... Transfert

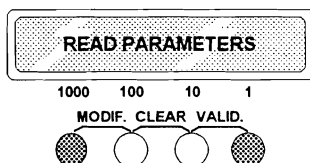


Press the 2 end buttons
to return to normal mode

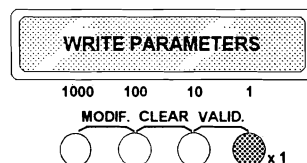


Transfer of the settings included in the diagnostic tool toward the VVVF.

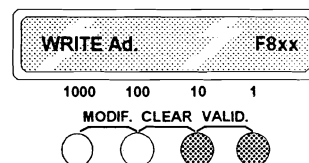
Press the 2 end buttons,
you read,
« **READ PARAMETERS** »



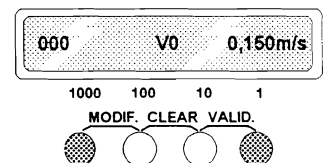
Display
« **WRITE PARAMETERS** »
using button 1



Validate by pressing the
« **VALID** » button
..... Transfert

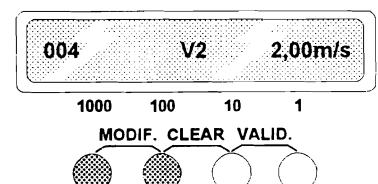


Press the 2 end buttons to
return to normal mode



To remind yourself of the address.

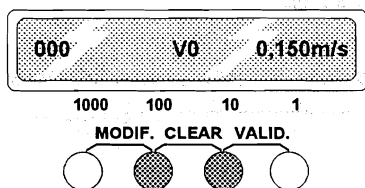
If you forget the address you are changing, or the previous value
shown, just press both **MODIF** buttons.



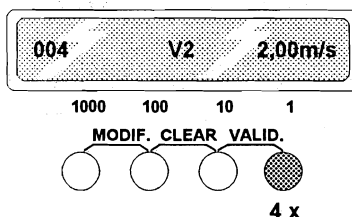
To change the parameters in decimal mode

After selecting the required language (see previous page) you can access the parameters and change them if required.

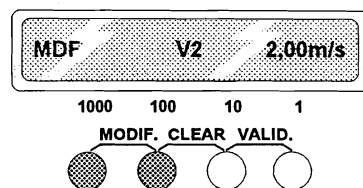
Reset the display by pressing both **CLEAR** buttons at the same time



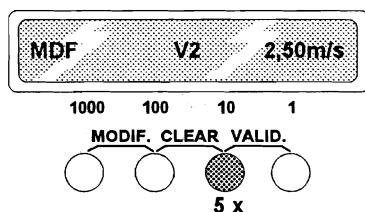
To change the **V2** speed for example, display address **004** by pressing button **1**



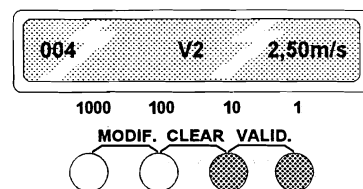
Press both **MODIF** buttons at the same time



Press button **10** 5 times to obtain the desired speed



Register the new speed by pressing both **VALID** buttons at the same time

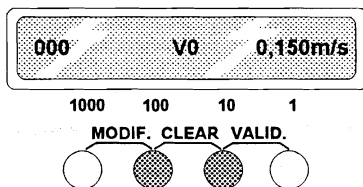


To change the parameters in segment mode

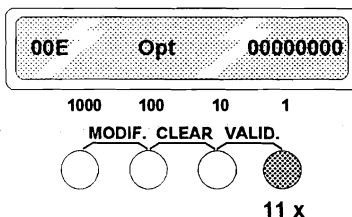
You can access the options using segments and change them if so desired.

Seg0 : IG, **Seg1** : NOBAND, **Seg2** : BATTERY, **Seg3** : MLI,
Seg4 : RETSEC, **Seg5** : APPDIR, **Seg6** : D65°, **Seg7** : ML220V

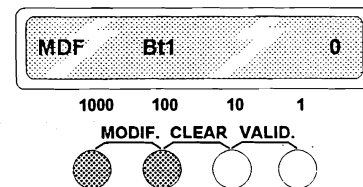
Reset the display by pressing both **CLEAR** buttons at the same time



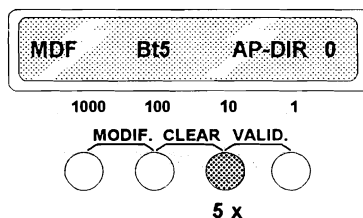
Display address **00E** by pressing button **1**



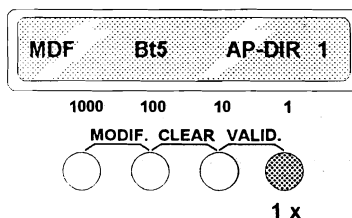
Press both **MODIF** buttons at the same time



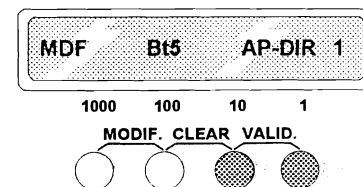
Press button **10** to obtain the required segment
example : **Direct approach**.



Press button **1** to activate segment **5**.



Register the new data in the memory by pressing both **VALID** buttons at the same time.



EXPLANATION OF PARAMETERS (1/7).

- Address **000** : **V0**, V0.

At this address is programmed V0 which can also be used as a relevelling speed.

Units :	metres per second (m/s)		
Mini :	0,001 m/s	Maxi :	0,199 m/s
Factory value :	1/10 of V2		

- Address **001** : **ISO**, Relevelling speed.

At this address is programmed the relevelling speed.

Unit :	metres per second (m/s)		
Mini :	0,000 m/s	Maxi :	< V0
Factory value :	0,020 m/s		

- Address **002** : **INS**, Inspection speed.

At this address is programmed the Inspection speed which can also be used as an intermediate speed if V1 is not used.

This speed is taken into account when the inspection input (INS/ on K30) is activated (VINS Led lit).

Unit :	metres per second (m/s)		
Mini :	0,20 m/s	Maxi :	0,60 m/s
Factory value :	0,50 m/s		

- Address **003** : **V1**, Intermediate speed V1.

At this address is programmed the Intermediate speed V1.

Unit :	metres per second (m/s)		
Mini :	0,61 m/s	Maxi :	< V2
Factory value :	0,61 m/s		

EXPLANATION OF PARAMETERS (2/7).

- Address **004** : **V2**, Full speed V2.

At this address is programmed the Full speed.

Unit :	metres per second (m/s)		
Mini :	> V1	Maxi :	04,00 m/s
Factory value :	Clients specification		

- Address **006** : **VSy**, Synchronous speed.

At this address is programmed the movement speed of the car when the motor turns at its synchronous speed.

- 1500 t/min for a 4 pole motor
- 1000 t/min for a 6 pole motor

Unit :	metres per second (m/s)		
Mini :	0,000 m/s	Maxi :	9,999 m/s
Factory value :	Spécificité client		

Formula :

Calculation of the synchronous speed for a 1500 t/min motor : $V_{Sy} = \frac{1500}{60} \times \pi d$
Reductor ration x roping

$\pi = 3,14$ - d = diameter of the pulley - Roping = 1 or 2 or 4

- Address **008** : **DV2**, Slow-down distance on V2.

At this address is programmed the slow-down distance necessary when in full speed V2.

Unit :	metre (m)		
Mini :	0,000 m	Maxi :	9,999 m
Factory value :	Clients specification		

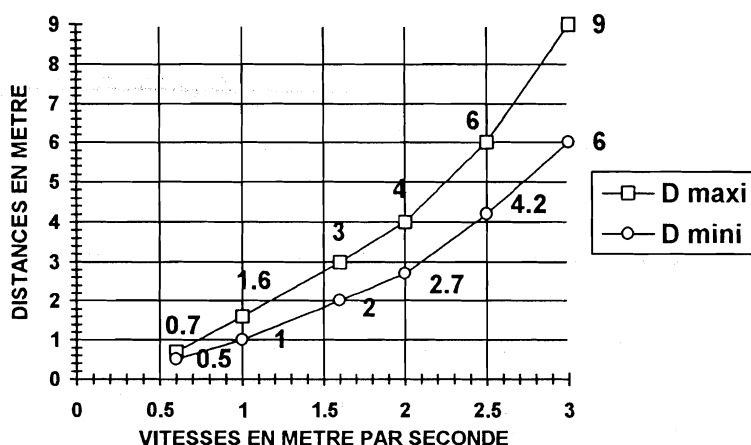


Figure 3
Slow-down distance value (DV2) in fact of the full speed (V2)

EXPLANATION OF PARAMETERS (3/7).

- Address **00A** : **Acce**, Acceleration.

At this address is programmed the time to reach V2 speed.

Unit :	second (s)		
Mini :	02,0 s	Maxi :	25,5 s
Factory value :	03,0 s		

- Address **00B** : **FrArr**, Brake time on stopping.

At this address is programmed the time to stabilise the rotor before the brake is dropped.

Unit :	second (s)		
Mini :	0,30 s	Maxi :	0,80 s
Factory value :	0,5 s		

- Address **00C** : **FrDem**, Brake time on start-up.

At this address is programmed the time during which the rotor is stabilised to allow the brake to lift correctly before start-up.

Unit :	second (s)		
Mini :	0,00 s	Maxi :	0,60 s
Factory value :	0,5 s		

- Address **00D** : **Thermi**, Motor thermistor.

At this address is programmed the current at which the electronic thermal relay is activated. (since programme V02)

Unit :	Ampere (A)		
Mini : A	Maxi : A
Factory value :	Spécificité client		

The thermal relay switches switch off if the motor intensity (Imot) is higher than the thermal intensity (Ith) for longer than 3,5 seconds or if the motor intensity (Imot) is 1,5 A higher than the thermal intensity (Ith).

Imot can be seen at the address **108**, page **35**.

EXPLANATION OF PARAMETERS (4/7).

- Address **00E** : Opt, Option.

Segment **7** : **ML220V**, MLift 220V.

00E Opt **10000000**

Segment 7 is programmed ON when the Vector drive is on a **three phase 220V network**.

Segment 7 is programmed OFF when the Vector drive is on a **three phase 400V network**.

Segment **6** : **D65°**, Fault T°>65°.

00E Opt **01000000**

Segment 6 is programmed ON to increase the radiator temperature detection threshold from 60°C to **65°C**.

Segment 6 is programmed OFF to keep the detection threshold at 60°C.

Segment **5** : **APPDIR**, Direct Approach.

00E Opt **00100000**

Segment 5 is programmed ON to remove V0 so that the car can level with direct approach.

Segment 5 is programmed OFF if this is not desired.

Segment **4** : **RETSEC**, Delay on safety contactor.

00E Opt **00010000**

Segment 4 is programmed ON to filter the rebound of the S contactor contacts on start-up, and when these contacts are used to cut the motor power supply.

Segment 4 is programmed OFF when the S contacts are not used to control the motor.

Segment **3** : **MLI**, V.F. + « NON AUTINOR » Controller.

00E Opt **00001000**

Segment 3 is programmed ON when the VECTOR DRIVE is associated to an other controller than AUTINOR.

Segment 3 is programmed OFF when the VECTOR DRIVE is associated to an AUTINOR controller using the slotted tape.

Segment **2** : **BATERI**, Battery.

00E Opt **00000100**

Option available later in 1999

Segment 2 is programmed ON to activate the emergency return to floor level using battery power supply. This option requires an extra ,emergency power supply.

Segment **1** : **NOBAND**, No slotted tape.

00E Opt **00000010**

Segment 1 is programmed ON when there is no tape or O03 tape-head. In this case, a high speed tachometer is required.

Segment 1 is programmed OFF when the speed information comes from the slotted tape and O03 tape-head.

EXPLANATION OF PARAMETERS (5/7).

Segment **0** : **IG**, Integrator.

00E Opt **00000001**

Segment 0 is programmed ON when the VECTOR DRIVE slip integrator is to be activated.

Segment 0 is programmed OFF if this is not desired .

• Address **010** : **Modele**, VECTOR DRIVE Model.

At this address is programmed the VECTOR DRIVE model number. See the sticker on the Plexiglas or on the current measuring device label (VEC02M).

Unit :	None		
Mini :	2	Maxi :	9
Factory value :	Clients specification		

• Address **012** : **IFlux**, Maximum flux current.

At this address is programmed the maximum flux current. Normally, this current is measured with no load at 1500 tr/mn. This measurement is rarely possible on site, so the « empirical » method is to program the number of horsepower as found on the motor plaque.

Example :

If the motor plaque says **12 HP** \Rightarrow Program **12,0**

If the motor plaque says **12 kW**, transform into HP, $12 / 0,736 = 16,3 \Rightarrow$ program **16,3**

Unit :	Ampere (a)		
Mini :	000,1 A	Maxi :	999,9 a
Factory value :	Clients specification		

• Address **014** : **IFmin**, minimum flux current.

At this address is programmed the minimum flux current, which is approximately one half of the maximum flux current (see address 012). This parameter decreases the motor vibrations at low frequency.

Unit :	Ampere (a)		
Mini :	000,1 A	Maxi :	999,9 a
Factory value :	IFlux / 2 = (A)		

EXPLANATION OF PARAMETERS (6/7).

- Address **016 : Gliss**, Motor Slip.

At this address is programmed the motor slip.

Example of the slip calculation :

For a 4 pole motor, 50 Hz, which without slip would turn at 1500 rpm, yet the motor plaque states 1380 rpm,

the slip will be $\frac{1500 - 1380}{1500} = 0,08$ ie 8% \Rightarrow Program 08,0 %

Unit :	percent (%)		
Mini :	02,0 %	Maxi :	20,0 %
Factory value :	$\frac{1500 - 1380}{1500} = 0,08$ soit 8%		

If the RPM is not shown, use the table below once you have calculated the **Id / In** ratio (starting current / nominal current)

$\frac{Id}{In}$	Gliss Ad 016
2,5	10 %
3,5	8 %
4	5 %
5	3 %

- Address **024 : NCode**, Number of encoder impulses.

At this address is programmed the number of incremental encoder impulses.

Unit :	None		
Mini :	500	Maxi :	2500
Factory value :	500 ($500 < x < 2500$)		

- Address **026 : NPole**, Number of motor pole.

At this address is programmed the number of motor pole.

Unit :	None		
Mini :	004	Maxi :	006
Factory value :	4 or 6 pôles, if 6 pôles, Ncode = 750 min		

EXPLANATION OF PARAMETERS (7/7).

- Address **027** : **Country**, Language.

At this address can be programmed the language to be used on the VEC03 programming tool.

Possible choice : France, English, Deutsch *, Español

* In Germany, the Inspection speed can go up to 0,80 m/s and the levelling speed up to 0,50 m/s.

- Address **034** : **Dem**, Number of starts. . => **0 0 0 0 x x x x**

At this address, can be read the number of starts carried out by the lift and the 4 strong weight bits can be modified.

- Adresse **036** : **Dem**, Number of starts. => **x x x x 0 0 0 0**

At this address, can be read the number of starts carried out by the lift and the 4 light weight bits can be modified.

- Address **041** : **Test**, Transistor test.

At this address, can be written 55 to check the transistors.

All of the LEDs turn red if all of the transistors are working properly.

- Adresse **042** : **Prog**, Type of Programme.

At this address, the selected programme can be read.

VEC (VEctoriel) Vector, **SCA** (SCAlaire), **ARB** (ARBre lent) Gear Less.

- Adresse **043** : **TMan**, Type of Controller.

At this address, the type of controller associated with the VECTOR DRIVE can be read.

Normal (AUTINOR Controller or with a VEC06 interface board),
1Vit (1 speed controller), **2Vit** (2 speed controller)

- Adresse **044** : **Mcode**, Memorisation of a personal code number.

At this address can be memorised a personal code number to program against all chance intervention. The equipment set with the factory code **0000** allowing complete and permanent access to the set of settings.

After programming your code (Don't forget to take note of it), the address **044** disappears. If you want to modify the settings, enter your Code at the address **046**.

- Adresse **046** : **Code**, Access Code.

At this address, enter your Code to unlock the address **044** in order to modify the setting and/or change the memorised code.

EXPLANATION OF INPUTS (1/2)

- Address **100** : **En1**, Inputs 0 to 7.

Segment **7** : NOT USED.

100.En1 **10000000**

Segment **6** : **V2**, Speed V2. (Full speed)

100.En1 **01000000**

Indicates the State of the input for speed **V2**.

Segment **6 lights up** when the lift is required to move at speed **V2**.

Segment **6** is not lit otherwise.

Segment **5** : **V1**, Speed V1. (Intermediate speed)

100.En1 **00100000**

Indicates the State of the input for speed **V1**.

Segment **5 lights up** when the lift is required to move at speed **V1**.

Segment **5** is not lit otherwise.

Segment **4** : **V0**, Speed V0.

100.En1 **00010000**

Indicates the State of the input for speed **V0**.

Segment **4 lights up** when the lift is required to move at speed **V0**.

Segment **4** is not lit otherwise.

Segment **3** : **INS**, Inspection speed.

100.En1 **00001000**

Indicates the State of the **inspection** input.

Segment **3 lights up** when the lift is required to **move on inspection**.

Segment **3** is not lit otherwise.

Segment **2** : **VISO**, Relevelling speed.

100.En1 **00000100**

Indicates the State of the **relevelling** input. (VISO+ & VISO-)

Segment **2 lights up** when the lift is required to **relevel**.

Segment **2** is not lit otherwise.

Segment **1** : **DE**, Down.

100.En1 **00000010**

Indicates the State of the **Down** input.

Segment **1 lights up** when the lift is required to **go down**.

Segment **1** is not lit otherwise.

EXPLANATION OF INPUTS (2/2)

Segment **0** : **MO**, Up.102.En1**00000001**Indicates the State of the **Up** input.Segment **0 lights up** when the lift is required to **go up**.Segment **0** is not lit otherwise.• Address **102 : En2**, Inputs 0 to 7.Segment **7** : NOT USED.102.En2**10000000**Segment **6** : NOT USED.102.En2**01000000**Segment **5** : **CCL**, L Contactor Check.102.En2**00100000**Indicates the State of the **Line** Contactor.Segment **5 lights up** when the **Line** contactor is **de-energised**.Segment **5** it is not lit when the **Line** contactor is **energised**.Segment **4** : **CCS**, S Contactor Check.102.En2**00010000**Indicates the State of the **Safety** Contactor.Segment **4 lights up** when the **Safety** contactor is **de-energised**.Segment **4** it is not lit when the **Safety** contactor is **energised**.Segment **3** : NOT USED.102.En2**00001000**Segment **2** : NOT USED.102.En2**00000100**Segment **1** : **CAA**, Tape-head O03 - Beam **A**.102.En2**00000010**Indicates the State of the Beam **A** (Top Beam) on the O03 tape-head.Segment **1 lights up** when the Beam **A** is **cut**.Segment **1** is not lit otherwise.Segment **0** : **CAB**, Tape-head O03 - Beam **B**.102.En2**00000001**Indicates the State of the Beam **B** (Bottom Beam) on the O03 tape-head.Segment **0 lights up** when the Beam **B** is **cut**.Segment **0** is not lit otherwise.

EXPLANATION OF OUTPUTS.

- Address **101** : **Sor**, Outputs 0 to 7.

Segment **7** : NOT USED.

101 Sor **10000000**

Segment **6** : **FR**, Brake relay.

101 Sor **01000000**

Indicates the State of the **Brake relay** output (BR).

Segment **6 lights up** when the brake relay output is activated.

Segment **6** is not lit otherwise.

Segment **5** : NOT USED.

101 Sor **00100000**

Segment **4** : **DEF**, Fault Relay.

101 Sor **00010000**

Indicates the State of the **Fault relay** output (**DEF** on **VEC06** board).

Segment **4 lights up** when the fault relay output is activated.

Segment **4** is not lit otherwise.

Segment **3** : **RISO**, Relevelling Fault Relay.

101 Sor **00001000**

Indicates the State of the **relevelling fault relay** output (**RISO** on **VEC06** board).

Segment **3 lights up** when the relevelling fault relay output is activated.

Segment **3** is not lit otherwise.

Segment **2** : **VENT**, Fan relay.

101 Sor **00000100**

Indicates the State of the **Fan relay** output. (VENT).

Segment **2 lights up** when the fan relay output is activated.

Segment **2** is not lit otherwise.

Segment **1** : **S**, Safety relay.

101 Sor **00000010**

Indicates the State of the **Safety relay** output (S).

Segment **1 lights up** when the safety relay output is activated.

Segment **1** is not lit otherwise.

Segment **0** : **L**, Line relay.

101 Sor **00000001**

Indicates the State of the **Line relay** output(L).

Segment **0 lights up** when the line relay output is activated.

Segment **0** is not lit otherwise.

EXPLANATION OF VARIABLES (1/2)

- Address **103** : **T°**, Radiator Temperature in degrees Celsius (°)

At this address can be read the power transistors cooling radiator temperature.

- Address **104** : **TCont**, Capacitor Current in Volts (V)

At this address can be read the D.C. net capacitor terminal current.

- Address **108** : **Imot**, Motor Current in Amps (A)

At this address can be read the current in each phase of the motor.

- Address **10A** : **DV0**, V0 stopping distance in metres (m)

At this address can be read the distance necessary to smooth V0 into zero speed.

- Address **10B** : **Diso**, Relevelling stopping distance in metres (m)

At this address can be read the distance necessary to smooth VISO into zero speed.

- Address **10C** : **DIns**, Inspection slow-down distance in metres (m)

At this address can be read the slow-down distance associated with the inspection speed VINS.

- Address **10E** : **DV1**, V1 slow-down distance in metres (m)

At this address can be read the slow-down distance associated with the intermediate speed V1.

- Address **110** : **Fre**, Frequency sent to the motor in Hertz (Hz)

At this address can be read the instantaneous frequency applied to the motor.

- Address **112** : **Con**, reference in Hertz (Hz)

At this address can be read the reference/Ideal frequency to be followed.

EXPLANATION OF VARIABLES (2/2)

- Address **114** : **Vt**, Lift speed in metres per second (m/s)

At this address can be read the car speed.

- Address **116** : **Codeur**, Incremental encoder no Unit

At this address can be read the counting of the incremental encoder mounted on the motor.

- Address **118** : **Recup**, Energy regeneration in percent (%)

At this address can be read the percentage of energy consumed in the x regenerative resistors. (x = number of regenerative resistors depending of the drive model)

- Address **11A** : **Tmot**, motor power supply current in percent (%)

At this address can be read the power current applied to the motor.

- Address **120** : **GD**, Deceleration Gradient in V2 speed in metre per second squared (m/s²)

At this address can be read the deceleration slope associated with the different speed.

- Address **122** : **DRal**, Slow-down distance in metre (m)

At this address can be read the slow-down distance still to run.

- Address **12A** : **I Cap1**, Current measuring device 1 no Unit

At this address can be read the information given by the current measuring device 1

Note : At Stop the information should be between 500 and 524.

- Address **12C** : **I Cap2**, Current measuring device 2 no Unit

At this address can be read the information given by the current measuring device 2.

Note : At Stop the information should be between 500 and 524.


- Address **12E** : **I Cap3**, Current measuring device 3 no Unit

At this address can be read the information given by the current measuring device 3.

Note : At Stop the information should be between 500 and 524.

LIST OF VECTOR PARAMETERS AND FINAL VALUES.

Address	Name	Designation	Min values	Max values	Factory values	Finals Values	Page
000	V0	Set-up speed	0,001	0,199	1/10 de V2		25
001	Iso	Re-levelling speed	0,000	< V0	0,020 m/s		25
002	Ins	Inspection speed	0,20	0,60	0,50 m/s		25
003	V1	Intermediary speed	0,61	< V2	0,61 m/s		25
004	V2	Full speed	> V1	03,00	Clients specification (m/s)		26
006	VSy	Synchronous speed	0,000	9,999	Clients specification (m/s)		26
008	DV2	V2 Slow down distance	0,000	9,999	Clients specification (m)		26
00A	Acce	Acceleration	02,0	25,5	3,0 s		27
00B	FrArr	Brake stopping time	0,30	0,80	0,5 s		27
00C	FrDem	Brake starting time	0,00	0,60	0,5 s		27
00D	Thermi	Motor thermistor (A)			Clients specification (A)		27
00E	Opt	Hardware option			Clients specification (m/s)		28
00F	RgT°	Temperature Sonde Calibration			4 °c		
010	Model	Vector model	2	9	Clients specification		29
011	Tmor	Transistor pause time			1,5 µs		
012	IFlux	Flux current max	000,1	999,9	Number of horse power (A)		29
014	IFmin	Flux current min	000,1	999,9	IFlux / 2 = (A)		29
016	Gliss	Motor slip	02,0	20,0	$\frac{1500 - \text{RPM}}{1500} \times 100 = \%$		30
018	Jreg	Inertia			005 %		
019	GP max	Max Proportional Gain > 12 Hz			015		
01A	GP min	Min Proportional Gain < 12 Hz			004		
01B	GI max	Max integral Gain			010		
01C	GI min	Min integral Gain			001		
01D	G Deri	Derived Gain			000		
01E	GI Dep	Start up integral Gain			005		
01F	GP Dep	Start up Proportional Gain			005		
020	T Dema	Start up Voltage			006 %		
021	G Stabi	Stabilisation Gain			015		
022	FTmax	Max Voltage Frequency			050 Hz		
023	FMinD	Min Starting Frequency			0,10 Hz		
024	NCode	N° Encoder Teeth	0500	2500	500 (500 < x < 2500)		30
026	NPole	N° of motor Poles	004	006	4 or 6 pôles (if 6 pôles, NCode=750mini)		30
027	Country	Country Language					31

* Opt parameter Detail - OPTion - Address 00E :  ⇒ page 28.

Address	Name	Seg 7	Seg 6	Seg 5	Seg 4	Seg 3	Seg 2	Seg 1	Seg 0
00E	Opt	ML220V	D65°	APPDIR	RETSEC	MLI	BATERI	NOBAND	IG
FACTORY VALUE		0	0	0	0	1	0	1	0
FINAL VALUE									

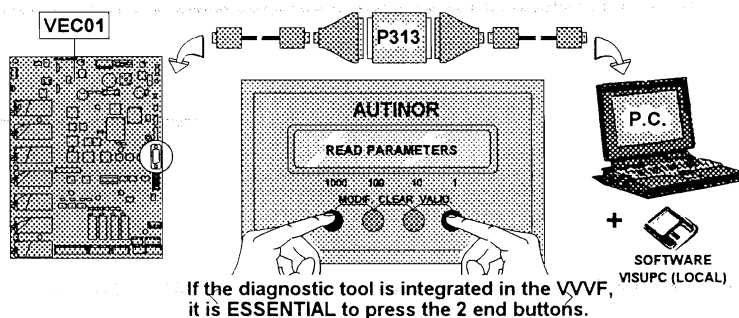
LIST OF VECTOR PARAMETERS AND FINAL VALUES

Address	Name	Designation	Min Values	Max Values	Factory Values	Finals Values	Page
028	PileDef	Fault 1					
029	PileDef	Fault 2					
02A	PileDef	Fault 3					
02B	PileDef	Fault 4					
02C	PileDef	Fault 5					
02D	PileDef	Fault 6					
02E	PileDef	Fault 7					
02F	PileDef	Fault 8					
030	PileDef	Fault 9					
031	PileDef	Fault 10					
034	Dem	Number of starts (Full load)	0000	9999	0000xxxx		
036	Dem	Number of starts (Empty)	0000	9999	xxxx0000		
038	Visu1 *	VISU n° 1 Address			PROGRAMMATION OF THE CURVES VISUALISED ON COMPUTER	F912	
039	Visu2 *	VISU n° 2 Address				F910	
03A	Visu3 *	VISU n° 3 Address				F904	
03B	Visu4 *	VISU n° 4 Address				F908	
040	HinTen	Disable of voltage control			00		
041	Test	Transistor Test (Program 55 for test)			00		31
042	Prog	Programme Type			VEC, SCA, ARB		
043	TMan	Controller Type			Normal, 1 speed, 2 speed		
044	Mcode	Code no memory			0000		
046	Code	Code no entry			0000		

* You can visualise the parameters, inputs/outputs, variables as well as the function graphs on a P.C., using the P313 interface board and the VISU P.C. programme.

To do this, connect the P313 set and push the 2 end buttons of the intergrated diagnostic tool VEC03. In order to make « **READ PARAMETERS** » appear on the display.

At the end on the P.C. visualisation, push the 2 end buttons.



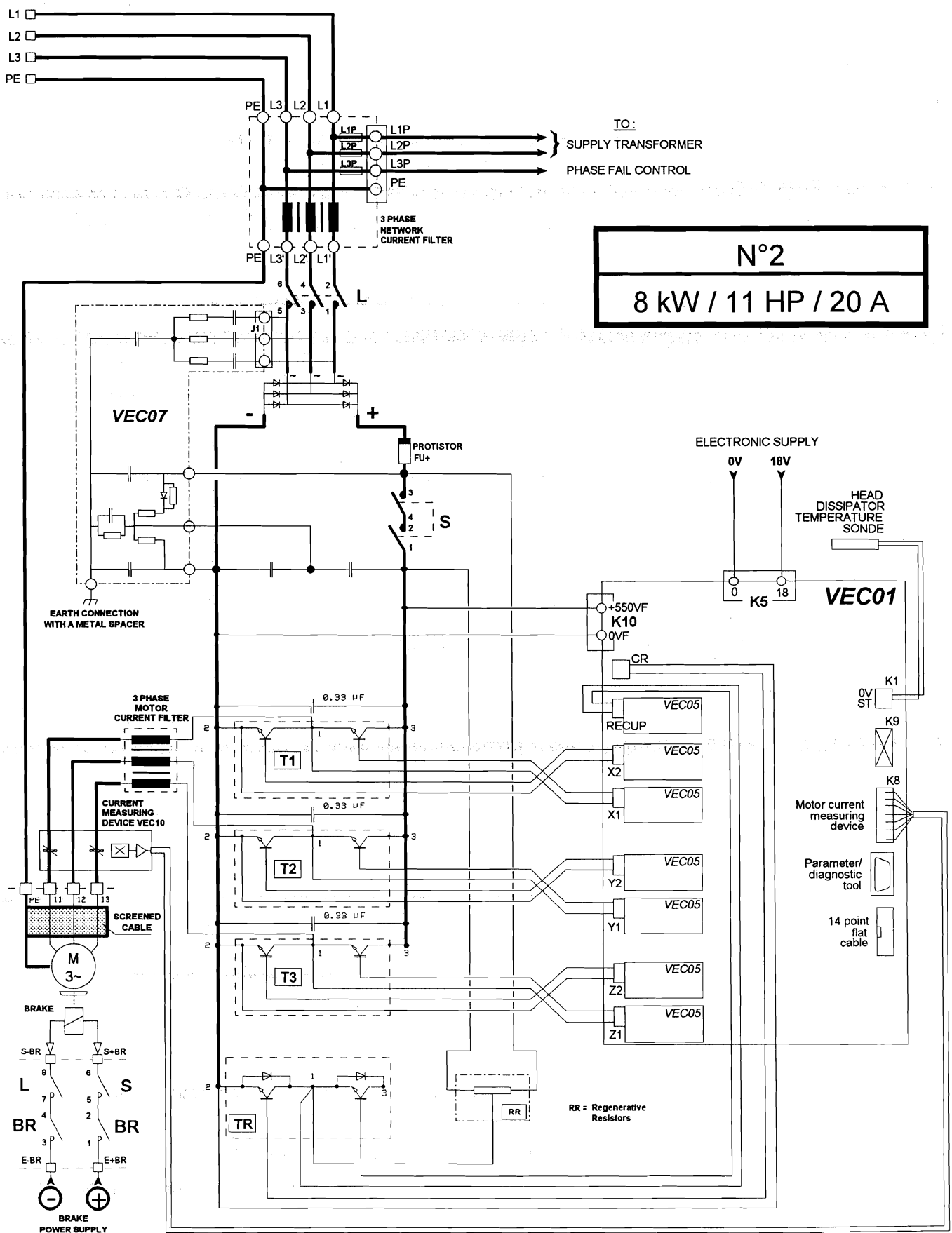
You can visualise :

- The theoretical graph : F912
- The real graph : F910
- The capacitor voltage : F904
- The efficient motor current : F908

Address	Name	Seg 7	Seg 6	Seg 5	Seg 4	Seg 3	Seg 2	Seg 1	Seg 0	Page
		Inputs 1								
100	En1		V2	V1	V0	INS	VISO	DE	MO	32
		Outputs								
101	Sor		FR		DEF	RISO	VENT	S	L	34
		Inputs 2								
102	En2			CCL	CCS			CAA	CAB	33
103	T°	Radiator Temperature (°C)								35
104	TCond	Capacitor voltage (v)								35
108	Imot	Motor Intensity (A)								35
10A	DV0	V0 Stopping distance (m)								35
10B	Diso	ISO Relevelling Stopping distance (m)								35
10C	DIns	Slow down distance in inspection speed (m)								35
10E	DV1	Slow down distance in speed V1 (m)								35
110	Fre	Frequency serf by the motor (Hz)								35
112	Con	Theoretical / reference (Hz)								35
114	Vt	Lift Speed (m/s)								36
116	Codeur	Incremental encoder								36
118	Recup	Energy recovery (%)								36
11A	TMot	Motor power voltage (%)								36
120	GD	V2 Speed slow down gradient (m/s²)								36
122	DRal	Slow down distance (m)								36
12A	I Cap1	Intensity measurement device 1								36
12C	I Cap2	Intensity measurement device 2								36
12E	I Cap3	Intensity measurement device 3								36

ELECTROMECHANICAL WIRING DIAGRAMS (1/4)

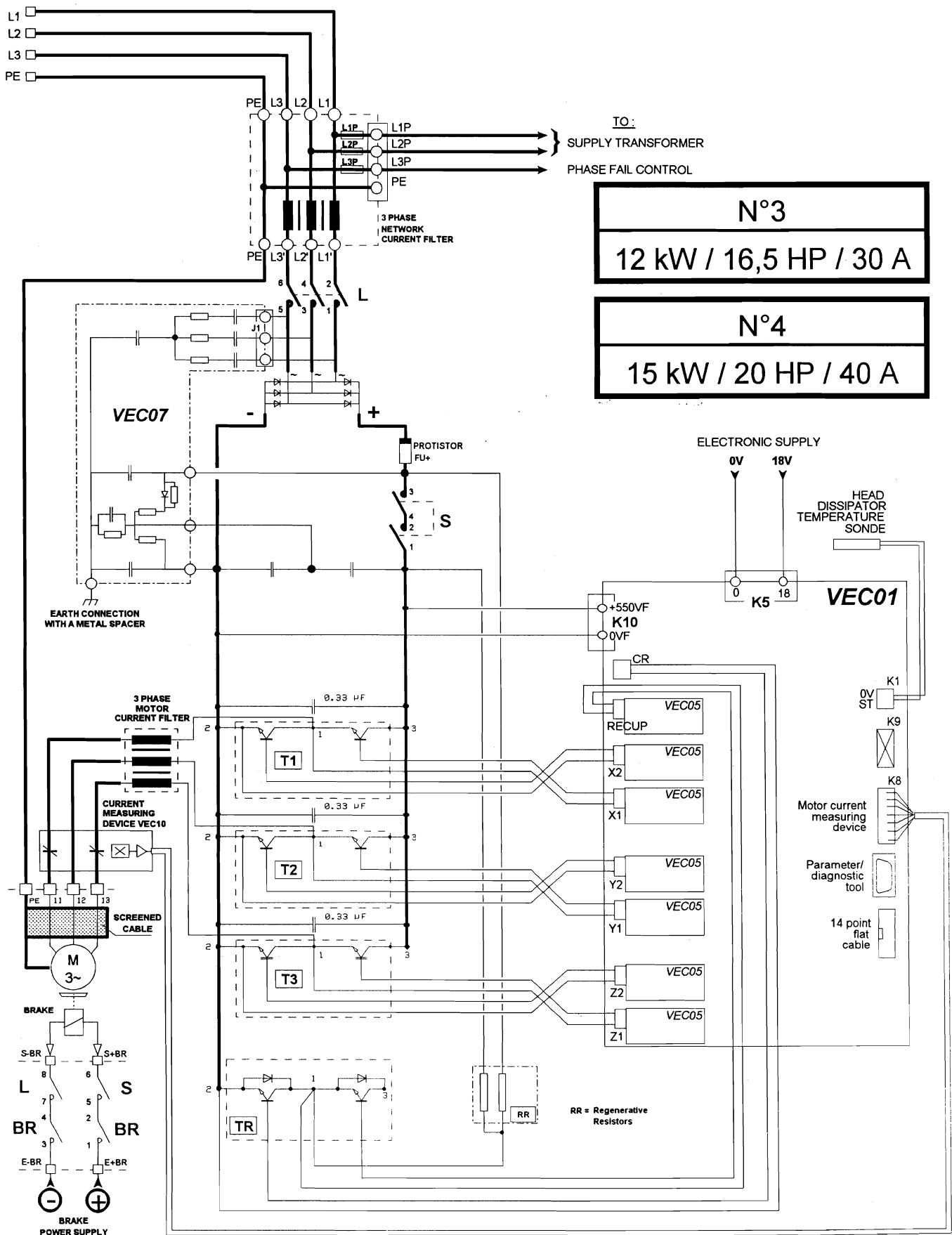
MODEL 2



=> See location and wiring of terminal blocks, page 17.

ELECTROMECHANICAL WIRING DIAGRAMS (2/4)

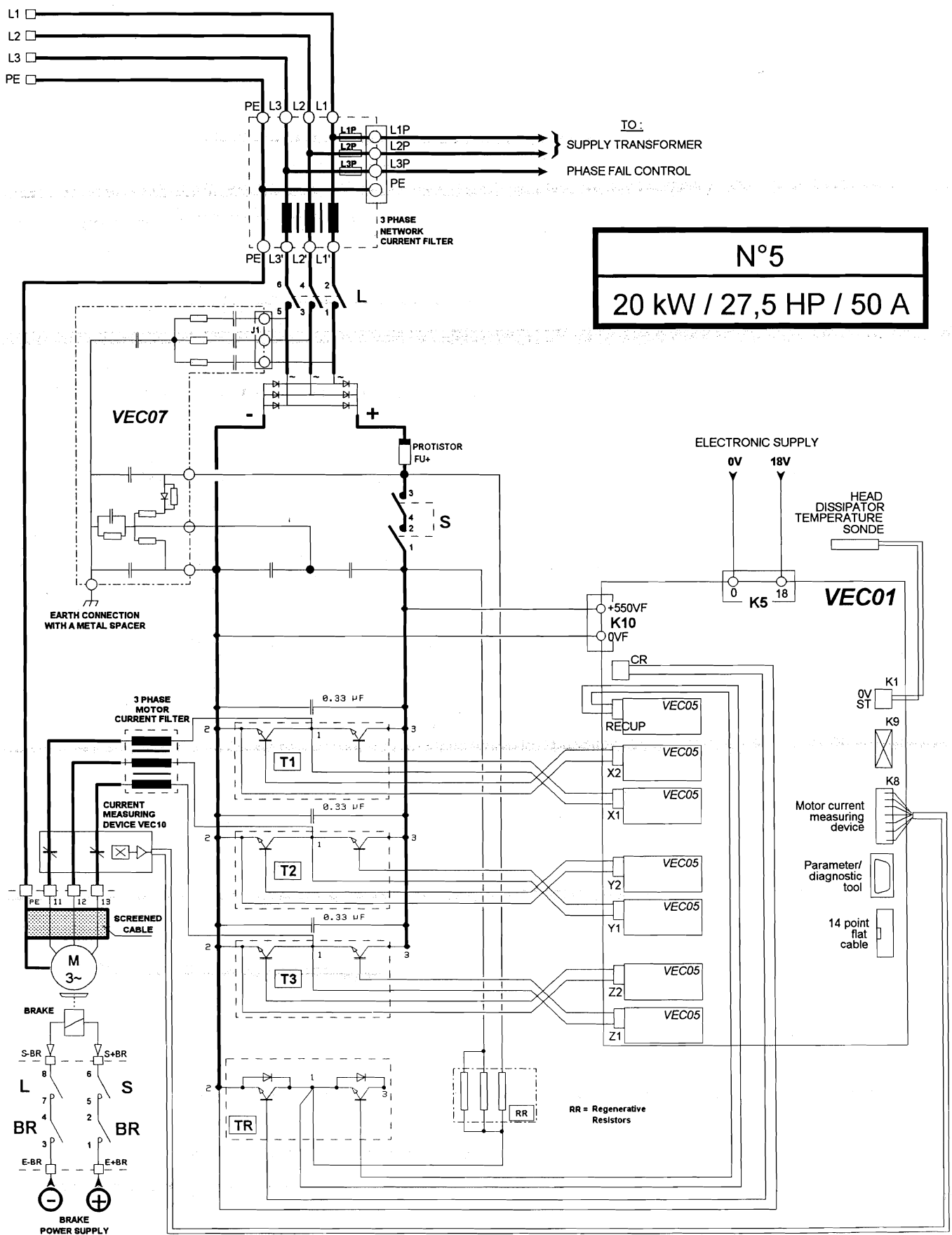
MODEL 3 - 4



=> See location and wiring of terminal blocks, page 17.

ELECTROMECHANICAL WIRING DIAGRAMS (3/4)

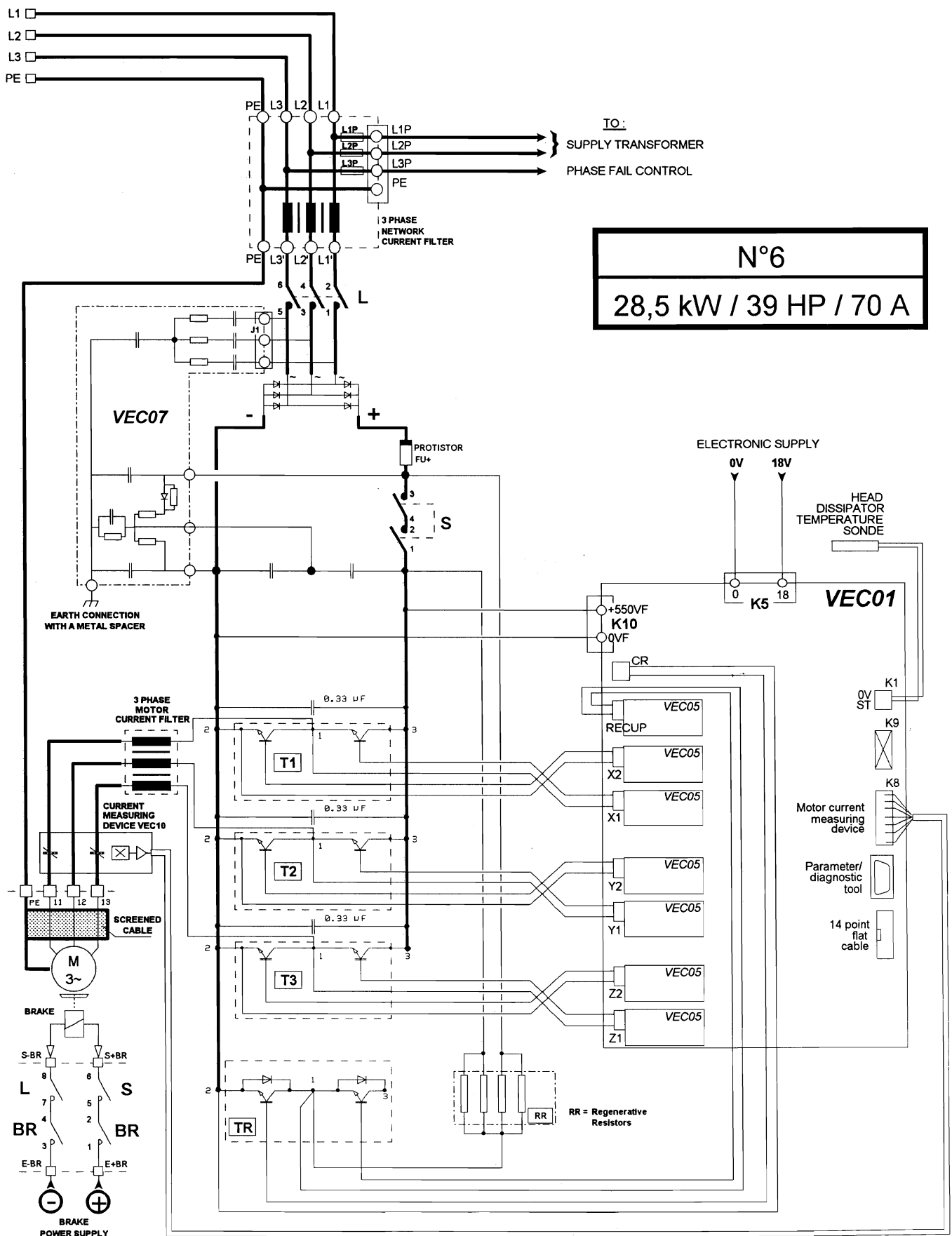
MODEL 5



=> See location and wiring of terminal blocks, page 17.

ELECTROMECHANICAL WIRING DIAGRAMS (4/4)

MODEL 6



=> See location and wiring of terminal blocks, page 17.

LIST OF VECTOR FAULT CODES

FAULTS DISPLAYED BY THE VECTOR DRIVE (VEC01 Board)

The VECTOR DRIVE fault code stack is found at Address 28, 29, 2A, 2B, 2C, 2D, 2E, 2F, 30 and 31. At Address 28 the most recent fault and at Address 31 the oldest recorded fault.

**BEFORE LEAVING THE SITE, SET THE FAULT LIST BACK TO 00.
IN THIS WAY YOU CAN KEEP BETTER TRACK OF ANY BREAKDOWNS.**

FAULT N°	DESIGNATION	VISUALISATION
-00-	FUNCTIONING CORRECTLY.	No fault
-10-	INVERSION IN THE ROTATION DIRECTION (DETECTED BY THE TAPE HEAD)	Phase inversion
-11-	CONSEQUENCE OF A AND B SIGNALS CHANGING STATE AT THE SAME TIME	Tape head fault
-22-	SLIP INTEGRATOR.	Integrator
-52-	« 10 » CUT WHILE IN MOTION.	10 cut while in motion
-62-	FAULT WITH THE O03 TAPE HEAD.	Tape head counting irrational
-80-	POWER SUPPLY CAPACITOR (tc) MISSING AT START-UP.	Current < 450 v at start-up
-81-	AVERAGE CURRENT HIGHER THAN ALLOWED CURRENT.	Thermistor
-82-	REAL SPEED 15% HIGHER THAN PROGRAMMED NOMINAL SPEED Vn.	Speed > 115% of Ia nominal speed
-83-	INSPECTION SPEED EXCEEDS 0,6 M/S.	Inspection speed > 0.6 m/s
-84-	RELEVELLING SPEED EXCEEDS 0,3 M/S.	Relevelling speed > 0.3 m/s
-85-	REGENERATIVE POWER EXCEEDS 650V (BRAKE CIRCUIT FAULT)	Regeneration
-86-	MISSING POWER SUPPLY DURING MOVEMENT COMMAND (FUSE BLOWN OR CONTACTOR NOT ENERGISED).	No power while in motion
-87-	LINE CONTACTOR NOT DROPPED.	Contactors not dropped
-88-	SIMULTANEOUS « UP » AND « DOWN » COMMAND.	Simultaneous up and down
-89-	RADIATOR TEMPÉRATURE EXCEEDS 40 °.	Radiator T°
-90-	AC CURRENT EXCEEDS MAX TRANSISTOR CURRENT.	Power supply too high
-91-	TRANSISTOR N°1 FAULT.(BOTTOM)	Transistor N°1 (bottom)
-92-	TRANSISTOR N°2 FAULT.	Transistor N°2
-93-	TRANSISTOR N°3 FAULT.	Transistor N°3
-94-	TRANSISTOR N°4 FAULT.	Transistor N°4
-95-	TRANSISTOR N°5 FAULT.	Transistor N°5
-96-	TRANSISTOR N°6 FAULT.(TOP)	Transistor N°6 (top)
-97-	REGENERATIVE TRANSISTOR FAULT.	Regenerative Transistor fault
-98-	PARAMÉTER FAULT	Parameter fault
-99-	EEROM WRITING FAULT.	Eerom writing fault
-100-	MOTOR INTENSITY > MAXI INTENSITY.	Motor intensity > Max
-101-	INCRÉMENTAL ENCODER FAULT.	Encoder fault
-102-	INCREMENTAL ENCODER SPEED +/- 15% FAULT.	Encoder speed +/- 15% Advised
-103-	DIRECT APPROACH FAULT.	MLIFT stop on V0 movement
-AUTRE-	NON PROGRAMMED FAULT.	Not programmed